INCIDENT REPORTING IN SHIPPING

Experiences and best practices for the Baltic Sea

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FOREWORD

Incident and near miss reporting is used as a proactive tool of safety management in many risk-prone industries. The International Safety Management Code requires shipping companies to establish a system for reporting incidents and near misses. However, it has been stated in several studies that incident and near miss reporting is deficient in the shipping industry. The aim of this report is to present experiences and best practices of incident reporting in order to offer information for improvement.

The study consists of three parts: a survey of shared reporting systems in shipping, an interview study in four shipping companies in Sweden and Finland and an expert workshop on incident reporting. The study shows that there are certain preconditions for a successful reporting system such as an existing no blame culture, commitment of the top management, feedback, good communication, training and an easy-to-use system, but although these were achieved, there still are challenges which are connected, for example, to psychological or nationality-related factors. In order to overcome these challenges, a successful reporting system requires that the company works continuously to achieve the desired benefits.

Although some progress has been made in connection with shared incident reporting systems in the shipping industry in the Baltic Sea area, the sharing of experiences and lessons learnt at industry level is still in its infancy. On the basis of this study we recommend having a shared system in the Baltic Sea area, which all the ships regardless of the flag could use. The benefits of such a wider system would be that there would be more cases available, it would support anonymity and it increase co-operation in maritime safety issues in the Baltic Sea area.

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ABSTRACT

Incident and near miss reporting is one of the proactive tools of safety management. By analyzing incidents and near misses and by corrective actions, severe accidents can potentially be avoided. Near miss and incident reporting is widely used in many risk-prone industries such as aviation or chemical industry. In shipping incident and near miss reporting is required by the mandatory safety management system International Safety Management Code (ISM Code). However, in several studies the conclusion has been that incidents are reported poorly in the shipping industry.

The aim of this report is to highlight the best practices for incident reporting in shipping and to support the shipping industry in the better utilization of incident reporting information. The study consists of three parts: 1) voluntary, shared reporting systems in shipping (international experiences), 2) interview study at four shipping companies in Sweden and in Finland (best practices), 3) expert workshop on incident reporting (problems and solutions).

Preconditions for a functional reporting system are an existing no blame culture, commitment of the top management, feedback, good communication, training and an easy-to-use system. Although preconditions are met, problems can still appear, for example due to psychological, interpersonal or nationality-related reasons. In order to keep the reporting system functioning, the shipping company must be committed to maintain and develop the system and to tackle the problems. The whole reporting process from compiling, handling and analyzing a report, creating corrective actions and implementing them has to be handled properly in order to gain benefits from the reporting system. In addition to avoiding accidents, the functional reporting system can also offer other benefits by increasing safety awareness, by improving the overall safety and working conditions onboard, by enhancing team work and communication onboard and between ships and the land-based organization of shipping companies.

Voluntary shared reporting systems are supported in the shipping industry in principle, but their development in the Baltic Sea is still in its infancy and the potential benefits of sharing the reports have not been realized. On the basis of this study we recommend that a common reporting system be developed for the Baltic Sea area which all the ships operating in the area could use regardless of their flag. Such a wider system could prevent some of the problems related to the current national systems. There would be more incident cases available in the database and this would support anonymity and thus encourage shipping companies to report to a shared database more frequently. A shared reporting system would contribute to the sharing of experiences and to the wider use of incident information in the shipping industry.

TIIVISTELMÄ

Vaaratilanneraportointi on yksi jatkuvaan parantamiseen tähtäävään turvallisuusjohtamisen työkalu. Lähtökohta vaaratilanneraportoinnissa on, että analysoimalla läheltä piti tilanteita ja vähäisiä onnettomuuksia sekä toteuttamalla ennakoivia korjaustoimenpiteitä voidaan välttyä vakavilta onnettomuuksilta. Vaaratilanneraportointi on yleisesti käytössä monilla riskialttiilla aloilla, kuten ilmailussa ja kemianteollisuudessa. Merenkulussa vaaratilanneraportointijärjestelmä sisältyy pakollisen turvallisuusjohtamisjärjestelmän eli ISM-koodin vaatimuksiin. Useissa tutkimuksissa on kuitenkin havaittu, että vaaratilanteita raportoidaan puutteellisesti merenkulussa.

Tämän raportin tarkoituksena on esitellä vaaratilanneraportoinnin parhaita käytäntöjä merenkulussa ja siten tukea merenkulkualaa vaaratilanteita koskevan tiedon hyödyntämisessä. Tutkimus koostuu kolmesta osiosta: 1) vapaaehtoiset jaetut raportointijärjestelmät merenkulussa (kansainväliset esimerkit), 2) haastattelututkimus neljässä varustamossa Ruotsissa ja Suomessa (parhaat käytännöt), 3) asiantuntijatyöpaja vaaratilanneraportoinnista (ongelmat ja ratkaisumenetelmät).

Ennakkoedellytyksiä toimivalle raportointijärjestelmälle ovat syyllistämätön ilmapiiri, johdon sitoutuminen, toimiva palaute, hyvä viestintä, koulutus sekä käyttäjäystävällinen raportointijärjestelmä. Vaikka ennakkoedellytykset olisivat kunnossa, raportointiin voi silti liittyä ongelmia, jotka voivat johtua esimerkiksi psykologisista, ihmissuhteisiin tai kansallisuuteen liittyvistä syistä. Jotta raportointijärjestelmä toimisi ja kehittyisi, tarvitaan varustamolta jatkuvaa sitoutumista järjestelmän ylläpitämiseen ja kehittämiseen sekä puuttumista raportointijärjestelmässä havaittuihin ongelmiin. Koko raportointiprosessin raportin tekemisestä sen käsittelyyn, korjaavien toimenpiteiden kehittelyyn ja niiden viemisen käytäntöön tulee olla kunnossa, jotta raportointijärjestelmästä voidaan saavuttaa hyötyjä. Hyödyt eivät kohdistu pelkästään mahdollisten onnettomuuksien vähenemiseen, vaan parhaimmillaan raportointijärjestelmä parantaa turvallisuutta ja työskentelyolosuhteita aluksella laajemminkin lisäämällä turvallisuustietoisuutta, kehittämällä toimintatapoja ja tiimityöskentelyä sekä parantamalla viestintää niin aluksella kuin aluksen ja maaorganisaation välillä.

Vapaaehtoisia jaettuja raportointijärjestelmiä kannatetaan merenkulkualalla periaatteessa, mutta niiden kehittäminen merenkulussa Itämerellä on vielä alkuvaiheessa eivätkä niiden mahdolliset hyödyt ole vielä toteutuneet kovin hyvin. Tulosten perusteella suositus on, että Itämeren alueelle kehitettäisiin yhteinen raportointijärjestelmä, jota kaikkia alueella liikkuvat alukset voisivat käyttää riippumatta alusten lippuvaltiosta. Laajempi yhteinen raportointijärjestelmä korjaisi joitakin nykyisiin kansallisiin järjestelmiin liittyviä ongelmia. Tapauksia kertyisi tietokantaan enemmän ja laajempi tietokanta tukisi paremmin raporttien anonyymiyttä ja siten kannustaisi varustamoita raportoimaan järjestelmään. Jaettu raportointijärjestelmä lisäisi tiedonvaihtoa riskitekijöistä ja mahdollistaisi kokemusten vaihdon ja vaaratilannetiedon laajemman hyödyntämisen merenkulkualalla.

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DEFINITIONS

AB	Able bodied seaman
Accident	A hazardous event with severe consequences to humans, environment or property
AMOS	Software "Asset Management Operating System" for handling e.g. safety management
CAFE project	Competitive Advantage by SaFEty project, co-ordinated by Kotka Maritime Research Centre, www.merikotka.fi/cafe
CHIRP	Confidential Hazardous Incident Reporting Programme (UK)
DPA	Designated Person Ashore, a person responsible for ensuring the safe operation of each ship and providing a link between the Company and those on board, as required by the ISM Code.
EMCIP	European Marine Casualty Information Platform (the European Union)
ForeSea	Maritime confidential reporting system in Finland
IMISS	International Maritime Incident and Near Miss Reporting Conference 2011, held 1-2 September, in Helsinki
IMO	International Maritime Organization
Incident	A hazardous event with minor or negligible consequences
Insjö	Maritime confidential reporting system in Sweden
IRIS	Incident Report Information System; software for shipping companies to make and handle incident reports.

ISM Code	International Safety Management Code, part of SOLAS Convention
Near miss	An event which could have caused an accident or an incident if a chain of events would not have been disrupted somehow.
Nearmiss.dk	Maritime confidential reporting system in Denmark
REPCON	Marine confidential reporting system in Australia
SECURITAS	Confidential reporting system in Canada
SOLAS Convention	International Convention for the Safety of Life at Sea of the International Maritime Organization

1 INTRODUCTION

1.1 Background of the study

The international shipping community awoke to deficiencies of safety management especially after the accident of ro-ro and passenger ferry *Herald of Free Enterprise* in 1987. As a result, the International Maritime Organization (IMO) adopted the International Safety Management Code (ISM Code) under the SOLAS Convention in 1990's. The ISM Code requires shipping companies and ships belonging to the scope of the SOLAS Convention to establish a documented safety management system. One of the requirements of the ISM Code is to establish a system for learning from incidents and near misses in order to promote continuous learning in a proactive way, or in other words, to tackle safety risks before they cause an accident. Incident reporting is also a way of institutionalizing and formalizing organizational communication and learning (Sanne 2008).

The importance of incident and near miss reporting in the development of safety in a proactive manner is recognized in many risk prone industries, such as the nuclear and chemical industries or in aviation (e.g. Jones et al. 1999; van der Schaaf & Kanse 2004; O'Hare et al. 2008; Sanne 2008; Lindberg et al. 2010; Oltedal & McArthur 2011). In short, the fundamental theory of incident reporting is the so-called iceberg model or accident pyramid developed originally by H.W. Heinrich (1959), who concluded that for every serious accident there are 29 less serious accidents and 300 near miss cases, and that near misses and incidents have the same underlying reasons as serious accidents. So, by studying incidents and near misses, serious accidents can be avoided. There is also empirical proof from different industries that by studying incidents, the number of accidents is decreased, although there has been discussion what the real ratio is (or is there any stable ratio) between the numbers of serious accidents, less serious accidents and near misses and do near misses or incidents actually share same underlying reasons as accidents. (See e.g. Jones et al. 1999; Nielsen et al. 2006; Salminen et al. 2007; Sanne 2008.)

The impacts of the ISM Code on the maritime safety culture of the Finnish shipping industry were studied by Lappalainen (2009; 2011), who found that incidents and near misses are reported poorly in the Finnish shipping industry. Similar results have also been found in other analyses of the impacts of the ISM Code (see: Hahne et al. 2000; Anderson 2003; Othman 2003; IMO 2005; Ek & Akselsson 2005; Paris MOU 2008) or of the incident reporting in the shipping industry (Oltedal & McArthur 2011).

The on-going CAFE project (Competitive Advantage by SaFEty) has continued the work on incident and near miss reporting in shipping. This report presents the results of Work Package 1, task B "International reporting of incidents and near misses". The study consists of three parts: 1) a survey of shared reporting systems in shipping, 2) best practices of incident reporting in selected shipping companies in Sweden and in Finland, and 3) the results from expert workshops discussing incident and near miss reporting. The aim of the study was to find the best practices of incident reporting on

the international, national and company levels in order to offer tools to improve the utilization of incident reporting in the shipping industry, especially in the Baltic Sea area.

1.2   Definitions and the scope of the study

The use and definitions of such terms as *accident*, *incident* or *near miss* vary considerably. Generally, an accident results in some kind of damage or injury, and a near miss is a hazardous event or situation where the sequence of events could have caused an accident if it had not been interrupted. The incident lies somewhere between these two, meaning an event, which has some minor or negligible consequences. Sometimes the term incident is used to refer to both accidents and near misses (Jones 1999). In this report, the focus is on such incidents and near misses, which are not accidents and do not have severe consequences and which do not have to be reported to authorities on the basis of legislation concerning e.g. accident investigation. However, the ISM Code requires that shipping companies establish a system for the reporting of non-conformities and hazardous events. According to IMO (2011), a non-conformity means an observed situation where objective evidence indicates the non-fulfillment of a specified requirement. A major non-conformity means an identifiable deviation that poses a serious threat to the safety of personnel or the ship or a serious risk to the environment that requires immediate corrective action. In this report, the term "incident reporting system" is used in most cases for the sake of simplicity.

Incident reporting systems can be implemented in two levels: 1) an internal reporting system in a company, and 2) a national or international level shared reporting system. In this report, both internal reporting systems in the selected shipping companies in the Baltic Sea area and shared reporting systems are studied with the focus on the shipping industry belonging to the scope of the SOLAS Convention and the ISM Code. The ISM Code requires shipping companies to have an internal reporting system, but the use of shared systems is voluntary for the shipping companies, although there has been some discussion if it should be mandatory.

The theoretical background and discussion concerning incident reporting is not dealt with in this report. These matters have been discussed in more detail for example in Vepsäläinen & Lappalainen (2010), Jones et al. (1999), van der Schaaf & Kanse (2004), O'Hare et al. (2008), Sanne (2008), Oltedal & McArthur (2011). The analysis methods of incident reports are also excluded from this report. Information about them is found for instance in Johnson (2003) or in Lanne et al. (2006).

1.3   The structure of the report

The study includes an Internet survey of the shared reporting systems in shipping (Chapter 2), the results of interviews carried out at four shipping companies in Sweden and in Finland (Chapter 3) and the results of expert workshops which were arranged as part of "the International Maritime Incident and Near Miss Reporting Conference

(IMISS) 2011" in Helsinki during 1- 2 September 2011 (Chapter 4). The methodologies for each chapter are explained in more detail in the beginning of each chapter.

Chapter 5 summarizes and brings together the main findings from the chapters 2-4 in order to find the best practices for shipping companies and for the shipping industry to improve the utilization of incident reporting. General conclusions are presented at the end of the study.

This report has been written by project manager Jenni Storgård in co-operation with Ilknur Erdogan, a trainee at the University of Turku and a student at Chalmers University of Technology, and with Professor Ulla Tapaninen from the Centre for Maritime Studies at the University of Turku. Interviews for this study have been carried out by Ilknur Erdogan, who has also written a part of Chapter 3.

2   VOLUNTARY SHARED REPORTING SYSTEMS IN SHIPPING

In this chapter, we look at some examples of voluntary maritime incident reporting systems that are in use in the shipping industry. The aim is to compare how shared reporting systems in the maritime industry can be organized. The information about shared reporting systems is mainly based on information found on the Internet. The list is not exhaustive. It should also be noted that as the national legislation may vary concerning the events which are mandatory to report, the scope of voluntary reporting systems may vary from one flag state to another.

2.1   CHIRP - UK Confidential Reporting Programme for Aviation and Maritime

CHIRP is an incident reporting system for the global maritime and aviation industry. For the maritime industry, the system (also known as Maritime Confidential Hazardous Incident Reporting Programme) is operated by a charitable company, limited by guarantee, and it is funded by the UK Department of Transport and the Civil Aviation Authority and the following sponsors: The Corporation of Trinity House, Lloyd's Register Educational Trust, The Britannia Steam Ship Insurance Association Ltd and The Standard P&I Club. The reports to CHIRP can be sent by anyone from either the shipping industry, the fishing industry or leisure users. Reporting cannot be done anonymously, but confidentiality is guaranteed throughout the process. (Vepsäläinen & Lappalainen 2010)

The reporting form can be filled on the Internet and it contains information about the background of the reporter (position, contact information), information about the vessel, date, time and place of incident and also the hours on duty before the incident, weather conditions and free description of the event, including the chain of events, communication, decision-making, equipment, situational awareness and lessons learned from the incident. (CHIRP 2011)

Approximately 100 maritime reports are received every year. The information gained through the reports is published regularly in a quarterly newsletter "Maritime Feedback" which can be downloaded from the web site www.chirp.co.uk. The newsletter is also distributed in printed form, about 120 000 copies per issue. The newsletter contains summaries of received reports with comments to each case. In addition, recommendations are also distributed directly to the parties involved (Report on the Periodic Review of the Maritime Confidential Hazardous Incident Reporting Programme 2009).

Periodic independent reviews have been carried out to evaluate if the program has been cost effective. Reviews are carried by a Review Board comprising volunteers from the CHIRP Maritime Advisory Board and independent members selected for their expertise in maritime matters and/or accident investigation. Evaluation was done by inviting the maritime community to send in their comments about the program. In addition, the questionnaire was sent to all members of the CHIPR Maritime Advisory Board. (Report

on the Periodic Review of the Maritime Confidential Hazardous Incident Reporting Programme 2009)

The latest evaluation is from 2009 and the conclusion was that benefits from the program outweigh the costs, although it was noted that the process of changing the safety culture of the maritime industry takes time and the full benefits have not yet been achieved from the system since it was introduced in 2003. The key aspect of the system, and the difference compared with other accident and investigation reporting systems, is that it enables reporting for mariners who are unable or unwilling to discuss about incidents with their employers, or if no action has resulted from reporting. The confidentiality in the system is thus essential to avoid the creation of a blame culture. Concrete examples have been found of how reporting to the system has triggered a change e.g. in shipping companies. The activity of the program director to promote the program was reported to be crucial especially in the implementation phase. (Report on the Periodic Review of the Maritime Confidential Hazardous Incident Reporting Programme 2009)

2.2   REPCON - Marine Confidential Reporting Scheme in Australia

REPCON is maintained by the Australian Transport Safety Bureau within the Australian Government and anybody can report any maritime or aviation safety concern into the system. Anonymous reporting is not possible, but reports are processed confidentially into the REPCON database by REPCON staff. Safety concerns are sent out in the form of alerts or information bulletins to the person or organization in the position to take action in response to the safety concern. (Australian Transport Safety Bureau 2011a)

The reporting form contains background information of the reporter, background information about the ships involved, type of incident, place, date, time, voyage phase, weather conditions, description of safety concerns and suggestions how to address the safety concern. Many of the questions are presented in multiple choice format. (Australian Transport Safety Bureau 2011b) The number of reports to REPCON was 144 during a one year period in 2009/2010, however the number includes reports concerning both aviation and maritime safety concerns (Australian Transport Safety Bureau 2011c).

Safety recommendations and advisory notes resulting from accident and incident investigation are published in the web pages and they include such information as to whom recommendations are targeted at, including company names, and if a target group or party has taken any action on the basis of a recommendation (Australian Transport Safety Bureau 2011d).

2.3   SECURITAS - Confidential reporting in Canada

The SECURITAS confidential reporting system is maintained by the Transportation Safety Board of Canada, which is an independent agency created by an Act of Parliament. The agency deals with all modes of transport except road transport and its main duties include investigations of accidents and other unwanted occurrences. Through SECURITAS, anybody can make reports about potentially unsafe acts or conditions relating to the Canadian transportation system that would not normally be reported through other channels. Data is used to support studies and analyses of the Transport Safety Agency and this has been perceived to help identify safety deficiencies. TSB normally forwards the information, often accompanied with suggested corrective action, to the appropriate regulatory authority, or to specific transportation organizations, companies and agencies. Anonymous reporting is not possible also in this system, but reported information is processed confidentially. (Transportation Safety Board of Canada 2011a)

Reports can be submitted to SECURITAS by letter, fax, e-mail or telephone. There is no official reporting form, but the authors of reports are asked to include the following information: contact information, affiliations, the reporter's role in the unsafe situation, how the unsafe situation was perceived, what happened, where, when and why the situation took place, and suggestions to correct the situation. (Transportation Safety Board of Canada 2011a) The number of voluntary marine reports (including also e.g. fishery) has decreased during 2005-2010 from slightly under 100 reports per year to about 50 reports in 2010. Moreover, the number of reported marine accidents decreased in the same time period from approx. 500 accidents to 350 accidents. (Transportation Safety Board of Canada 2011b).

In relation to accident investigations, the Transportation Safety Board of Canada also publishes recommendations, responses from concerned parties and assessments of implementation on their website (Transportation Safety Board of Canada 2011c).

2.4   Insjö – Sweden

The Insjö system was launched in Sweden in 2002 to collect information about accidents and near misses in shipping. The system was initiated together with the maritime administration in Sweden and the Swedish Shipowners' Association and its members. Reports are entered to the system by the ISM responsible officer (Designated Person Ashore DPA) at the shipping company. The independent administrator of the system (IPSO Classification & Control Ab) erases any information that could make the report identifiable and sends the DPA information about the similar reports that have already been entered into the database. The reporting form (see Fig. 2.1) consists of four open-ended questions on the following topics: incident, consequences, cause and measures for improvement. Reports are gathered to a data bank, which can be used via Internet. Reports are either in Swedish or in English. In addition, some key figures (e.g. ship type, type of incident, consequence type etc.) from the reports are published on the Insjö website (Insjö 2011).

Insjö database had approximately 2700 reports at the end of 2011 and almost 50 % of these are accidents, about 30 % near misses and about 20 % non-conformities. Over 70 % of the reports concern passenger ships or tankers and bulk carrier ships. (Insjö 2012)

The Swedish Shipowners' Association has 76 member shipping companies and about 60 companies are using Insjö (INSJÖ 2011). However, most of these companies are small and there are less than 10 active companies using Insjö. The most active companies are tanker companies. On a daily basis, 25-30 different users log in to the system to see or search the reports. The general problem is that only a part of the received reports are complete and useful to share (Interview with Olle Bråfelt/ IPSO Classification & Control Ab 2.9.2011).

Figure 2.1. Insjö report form.
(Source:
http://www.insjo.org/Erfarenhetsbanken/ErfarenhetsbankenRapporteratillerfarenhetsbanken.asp)

2.5   Nearmiss.dk - Denmark

Incident and near miss report system Nearmiss.dk was launched in Denmark in 2007. The system is used by Danish shipping companies and as in Insjö, DPAs enter the reports into the database. Active users include over 20 companies. The reporting form is similar to Insjö. Identifiable information is removed from the reports by the administrator, which is a private consulting company called SeaHealth. Only registered users of the system can access the reports, but also "safety alerts" (= selected reports) are published on the website about issues that have wider importance or in the event that several reports have been received about the same issue. Safety alerts are published either in Danish or in English. (Nearmiss.dk 2011) At the end of 2011, there were slightly less than 1900 reports in the database (Nearmiss.dk 2012).

2.6   ForeSea – Finland

Finland has been following in Sweden's footsteps and the Insjö system, and has recently been in the process of implementing the ForeSea incident reporting system. ForeSea is in many respects similar to Insjö: the reporting form is similar and only DPAs can make reports. Reports are handled by the same third party as in Insjö (IPSO Classification & Control Ab). At the end of 2011, the system is working in principle, but there have been no reports to the system so far. The Insjö, nearmiss.dk and ForeSea systems are planned to be united in the future (ForeSea 2011). The Finnish Shipowners' Association has 27 member shipping companies, and so far 12 shipping companies have joined the system, but as stated earlier, the system has not been in active use so far.

Reports are stored into the experience data bank, which lists the latest reports received, gives key figures of filtered reports and brings forward reports that are of special interest. DPAs can also mark a report as "safety alert" if he/she thinks there is an immediate safety concern, and give a safety index to a report to measure how serious the event has been. Safety alerts are distributed to the authorized users of ForeSea. In addition, "lessons learned" reports are formulated from the reports in the experience data bank by either the administration or the Finnish Shipowners' Association. Lessons learned reports are distributed to a wider audience. The public area without login offers access to the latest reports and key figures. (ForeSea 2011)

Both two systems, Insjö and ForeSea, can be connected to the IRIS Incident Report Information System, which is an information system developed for shipping companies to make and to handle incident reports. Shipping companies which use IRIS can send their internal report to a national reporting system via IRIS and thus avoid additional work when entering reports to a national reporting system (IRIS 2011). However, shipping companies can also use other electronic reporting systems (e.g. AMOS, SAFIR) or utilize a paper report based system.

2.7   EMCIP - European Marine Casualty Information Platform

The European Marine Casualty Information Platform (EMCIP) is a database for marine casualty information which is developed and operated by the European Maritime Safety Agency (EMSA). The database aims to deliver a range of potential benefits, for instance improved safety investigations and a deeper analysis of the results of these investigations, at-a-glance information to enable, for example, general risk identification and profiling and a compilation of 'lessons learned' from accidents. In other words, its goal is to facilitate the creation of statistics and other data in the field of marine casualties. The data is provided by the competent national authorities who have access to the stored data in addition to EMSA. Data can be used to formulate annual reports, statistics and safety studies. EMCIP also includes the severity category "marine incident (casualties without consequences)" (Autero 2011, EMSA 2011). The primary goal of EMCIP is to support the work of authorities and currently it is not meant for information sharing between shipping companies or other shipping related stakeholders.

3   INCIDENT REPORTING IN SELECTED SHIPPING COMPANIES IN SWEDEN AND FINLAND

This chapter presents the interview results from four shipping companies in Sweden and Finland. The aim of the interview study was to find the best practices concerning incident reporting in a shipping company. The interviewed companies included two passenger traffic companies, one oil shipping company and one off-shore icebreaking and industrial shipping company. The selected companies were recommended either by Insjö administrator or by other expert stakeholders to present the companies which in comparison with the shipping industry in general have relatively good safety and reporting culture. All except one company that was asked were willing to participate in the study. In addition, the person responsible for the maintenance of the Insjö system was interviewed.

The number of interviews totaled 32, including 5 DPAs, safety managers or marine superintendents (persons responsible for incident reporting at the company) (later this group is referred to simply as DPAs), 6 Masters from six vessels, 4 chief engineers from four vessels, 5 chief officers from five vessels, 1 officer, 10 ABs from five vessels and the Insjö administrator. Interviewees presented following nationalities: 20 Swedish, 10 Finnish and 2 Filipinos. All the participants were males. Ages ranged approximately between 25 and 65. The interviews were carried out from July to October 2011.

The interviews were carried out as semi-structured interviews. Semi-structured interviews have preset topics to be handled in the interviews, but at the same time they allow the interviewees to express themselves freely and bring out points they consider important. In semi-structured interviews, questions are generally open-ended questions which require more information from the interviewee than a simple 'Yes' or 'No' answer. With open-ended questions, there is a risk that the answering person may stray from the intended topic and the results are hard to categorize and analyze (Rugg 2007). This problem was minimized by introducing the topic and the scope of the study to the interviewees before the actual interview.

The questions were formulated on the basis of previous literature on incident reporting with the intention of finding best practices in incident reporting. The interviews covered the following themes:
- the reporting system and procedures at the company, the amount of reports, the development of reporting at the company,
- feedback and follow-up issues,
- the views and experiences regarding shared reporting systems,
- the role of incident reporting in the development of safety culture and safety level.

The complete list of questions is found in Appendix 1.

Generally, there were no major differences in the views of DPAs or ship personnel concerning the functionality of their incident reporting systems or the factors affecting reporting. In other words, the interviewed shipping companies appeared to have a common understanding about the system between the land-based organization and

ships. The views between different occupational groups (Masters, officers, chief engineers, ABs) differed from each other in perspective, but they also shared, to a large extent, common opinions about the system. Thus all interviews were handled as one entity without distinguishing between different occupational groups as this would have shown that, to a great extent, similar views existed in all the groups. The potential differences have been expressed in the text in relevant cases.

3.1   Reporting practices in interviewed companies

Three of the interviewed companies were using the IRIS system for near miss and incident reporting and one was using another electronic system called AMOS. At all the companies, it was also possible to compile a report on paper. At all the companies, the introduction of the electronic system had increased the number of reports although the interviewees did not always associate the increased number of reports with the change of the system. At one company, they had used the IRIS system for seven years and in the other two companies, for approximately two years. In the fourth company, they had used AMOS for four years. Almost all the interviewees thought that using the electronic system is more practical than doing reports on paper. Some companies had tried several systems and thought that IRIS was the best system so far. One interviewed Master stated that he prefers the paper system which is tidier and they can store them in the files. He felt that in the computer system, the reports disappear somewhere.

There were slight differences in the formal reporting procedures between the companies but in general, it was the Master's duty to compile a report into the system after he or she had received the information concerning the incident from deck officers or engineer officers. Other crew members did not compile reports to the system in most incident cases, but they reported the cases to the officers, although they could have performed the reporting to the system themselves. Interviewed ABs were in the opinion that reporting to the system is the duty of officers or a Master and they do not have the time or will to make the actual report if an incident or a near miss happens. However, some Masters and officers expressed their opinion that it would be better if everyone would do the reporting by themselves.

Three out of four companies advise their crew that they should report everything. The DPA of the fourth company believed that if they are advised to report every small detail, reporting loses its importance and relevance. He thinks that the crew can make the judgment about what to report and not to report. He says that the way to make the crew capable of deciding for themselves is communication. They include near miss reporting in the agenda for all safety meetings and encourage the crew to discuss near misses there. The DPA stated that after the discussion, probably 9 out of 10 occurrences end up with formal reporting.

The amount of received reports varies between companies (see Table 3.1). Two companies have about 12 reports per ship in a year. One company told that 56 near misses or incidents had been reported during a period of 1½ years from 24 vessels and one vessel had about 14-15 reports per ship in a year. However, almost all interviewees

stated that the number of reports is not an indication of safety level while the quality of the reports is more important. Three interviewees (2 Masters and one AB) explained that the number of reports can only be seen as an indication of safety awareness – ships with a higher number of reports are likely to have a good level of safety awareness.

Table 3.1. The average amount of near miss reports at interviewed companies

	Number of vessels	Number of near-miss reports	System used for
Company 1	7	14-15 reports per vessel/year	1,5 - 2 years
Company 2	10	12 reports per vessel/year	7 years
Company 3[1]	24	1-2 reports per vessel/year	1,5 – 2 years
Company 4	11	12 reports per vessel/year	4 years

Only few interviewees supported the idea for having some kind of a reward system for reporting as they saw this would only increase the number of useless reports or they thought that safety should be important in any case and they are reluctant to support the idea that safety is something based on which the crew is rewarded separately. Only one of the companies had set a goal for the number of the reports (from 12 reports per vessel to 15 reports in a year) and when ships reach this goal, a bonus is awarded. The DPA of the company saw that the goal and reward had already helped to increase the number of reports because the company thought that there had been too few incidents reported. At one company, innovations are rewarded. A chief officer and a Master at this company stated that the innovation idea is a good approach, while another chief officer said that the reward is not enough to truly encourage reporting and innovations.

Some interviewees expressed the opinion that a reward could encourage reporting. One chief officer stated that the offered reward could make people more aware of near miss reporting. Another chief officer stated a similar approach that rewarding might be useful in making people more aware and increasing the number of reports even though many of those reports might be unnecessary. One Master and an AB said that there is no reason why the system could not be tried. Another AB also believed that it is good to set some goals to reach, such as a certain number of reports per year, and thus it would be beneficial to try a rewarding system. One Master suggested that the best report of the year could be rewarded.

The DPAs of two companies explained that the number of reports varies or has varied between their ships. In one case, the nationality of the crew was different from the company's other vessel. Several people from the company visited the vessel along with an inspector from the maritime administration and they discussed the importance of reporting together. Now they receive more reports from this ship than from other ships. The DPAs recognized that the role of the Master is very crucial, based on a comparison

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[1] Company 3 operates in a business area with different type of ships and the reporting frequency varies between them. 1-2 reports per vessel/year is the average. The company states that they aim to bring all business areas to the same level.

of the number of reports between the ships. If a Master does not support and encourage reporting, the rest of the crew on the vessel is not likely to this either. One of the interviewed Masters was in the opinion that reporting of incidents is not so important and that they can deal with the risks effectively otherwise, for instance in the onboard safety meetings. The DPAs also emphasized that it does not mean that the ships which report less would necessarily be more risky ships – a vessel can have a good safety level also without incident reporting.

All the companies acknowledged that there are not many reports coming from the rating side. In addition, the interviewed ABs acknowledged that they do not report all incidents or near misses due to various reasons. They explained that so many near misses take place e.g. in mooring and in loading and unloading that it would take too much time to report all of them, or if the same kind of small incident happens regularly but does not cause any greater danger they do not see any use in reporting, or if the incident is some technical failure that is fixed immediately, one does not feel the need to report it. The DPs stated that they usually make a report when something serious could have happened. In principle, they were positive towards the reporting system and thought it is having the system is important for safety. Some ABs also stated that they fail to report because of laziness or that writing reports is not traditionally a part of the culture of seamanship. Six interviewed members of onboard personnel indicated that they have difficulties in defining what kind of incidents and near misses should be reported. One company stated that their next goal should be the active inclusion of the rating side in the reporting process.

At all companies, the possibility to make anonymous reports was offered, but it was told that this opportunity was seldom used because of the prevalent no blame culture and because a discussion about the event usually takes place onboard before making the report to the system. Many times it can also be deduced from the nature of the occurrence, who was responsible for the incident. It is also good that additional information about the event can be asked afterwards. However, at one company, the interviewed DPA told that they had received only one anonymous report, but that it was a very serious case, and this led the DPA to conclude that it is still important that anyone in the crew has the opportunity to make anonymous reports. In addition, the majority of other interviewees thought that it is good to have a possibility to report anonymously. For instance, new employees may find it more difficult to say something critical about the operations onboard than for employees who have worked in the same team for a long time or what is more, there can be problems in interpersonal relationships that inhibit open reporting.

In the case of all the companies, technical faults dominated in the reports. All the interviewees reported that there is no blame culture at their companies and that also crew members are aware of this, and therefore this would suggest that a blame culture is not the reason for the lack of human errors in the reports. Rather they saw the reason to be due to psychological or nationality-related factors: it is generally very difficult for people to admit that they have made a mistake. People also fear that other crew members think they are not capable of doing their job properly if they have made a mistake. Sometimes a report has been made in a way that the incident appears to be a

technical near miss although in reality, it was human factor that caused the incident. Two interviewees also pointed out that more attention should be paid to the man-machine interface, because sometimes technical errors can take place due to the reason that the technical devices are difficult or impractical to use.

3.2   Feedback and follow-up

The feedback process works quite similarly in all the companies, with minor differences. At three companies, the reports first arrive to the person responsible for the reporting system, the DPA or superintendent. Then the reports are distributed to technical or marine superintendents, depending on the nature of the incident. At one company, a report is distributed to all superintendents, and after this, the DPA receives the report and adds his ideas and forwards the report to the ships.

At one company, completed reports are shared with the entire fleet. In the other companies, the report is shared with the entire fleet or only with sister ships, depending on the subject of the event. At one company, there are set time limits for the handling of a report which comes from the ship, such as a 3 day limit for handling and forwarding the report to responsible technical or marine superintendents and 3 months to carry out the entire action and close the report. Others try to make the feedback process as fluent as possible. The IRIS system includes a 'lessons learnt' section where safety alerts and all the near misses from other ships of the company are listed. Masters have access to this section. The company using the AMOS system prepares a quarterly report including all near misses and non-conformities and shares it with the entire fleet. It is also typical that incidents are handled in safety or other regular meetings either at company level or onboard ships.

Almost all the interviewees also brought out the importance of feedback, but there were divergent opinions on whether the feedback system is working at their companies. At one company, the DPA made a self-criticism that they are not very good at providing fluent and quick feedback. He explained that this is due to the operation department of the company, which, in his view, sees reporting only as the duty of the ISM Department. Some interviewed seafarers had experienced that feedback takes an excessive amount of time or that important reports had been dismissed. It was also brought out that sometimes proposed corrective actions had not been practical or there had not been any resources to make repairs. However, most interviewees said that they are content with the feedback. Direct forms of communication (e-mails, meetings) were generally thought to be better than the more passive methods (reading the feedback from the reporting system or from separate reports). One chief officer stated that the distribution of the feedback to everyone onboard depends greatly on the Master, because he is the person who reads the reports from the system first. Therefore, he argues that if the Master is not interested in safety issues enough, it is possible that the information flow stops there.

The rating side usually receives the feedback during the safety meetings, or some reports or safety alerts are posted on a board that they can read. Only at one of the

interviewed companies, all crew members participate in the safety meetings. At the others companies, the highest rank from each department takes part in these meetings. ABs who do not participate in the safety meetings were generally happy with the system. In other words, they did not want to participate. Same ABs reported that they receive certain kind of feedback a couple of times a year and they were also happy with that.

There were divergent views about who should propose corrective actions. The difference between the shore organization and the onboard organization is that people on the company side think that corrective and preventive actions to the incident and near-misses should be proposed by the people on board. On the other hand, people onboard claim that if they have already taken corrective actions, what are the benefits offered to them for reporting to the company system? The onboard personnel would like to see the shore representatives participating during the stage where corrective actions are proposed. Another possibility would be that companies - as they claim that corrective and preventive actions should be proposed by the people onboard - should find some practical ways of showing the benefits of their involvement.

At one company, the approval from ships is required to show that they are conscious about the feedback and accept it. At other companies, there is no follow-up system to check whether the preventive actions have been implemented onboard or not. The superintendent of one company also explained that for them, it is difficult to know whether the instructions really reach all the relevant employees or that the employees actually change their way of carrying out various matters. When the interviewees were asked the questions about feedback, many of them stressed the importance of communication and teamwork also in a wider sense than just feedback. It is not enough to start using the system, but the work has to be continuous; it is necessary to point out that incident reporting is important and that lessons learnt can prevent severe accidents and therefore reporting serves everyone's interest. Having good communication both between the ships and the land organization as well as onboard the ships is important. An open and reliable working environment supports good communication, and it is easier to achieve if employers know each other well and are used to working together.

3.3   National reporting systems

Three of the interviewed companies were sending reports to the Insjö system – in other words, the companies that used the IRIS system for internal reporting. However, one DPA stated that they usually skip sending the report to Insjö. In principle, he supported the idea of a shared system, but he criticized Insjö, suggesting that there should be more active users and especially smaller companies should also use the system. The DPA at one company described that they report to Insjö the cases which they believe are interesting for other companies. One company reported that they are one of the most active users of Insjö.

All the interviewed DPAs supported the idea of having a common system, for instance in the Baltic Sea area, which all the ships regardless of flag could use. Benefits of a

more international system would include more available cases and the support of anonymity compared to using the system within a single country, when it can be quite easy to deduce which company is in question. The DPA of the company that did not use the shared reporting system explained that the reason is that they would have to write the reports separately to the shared system because their internal system cannot be connected to the shared system. He still believed that an international system would be good but it should be very easy and simple to use and it should be integrated to the internal system. If a report has to be made separately to a shared system, it will not be made. Moreover, other interviewees stressed that the shared system must be kept simple, both in regard to its use and to the way lessons learnt are distributed.

In addition to the DPAs, a majority of the other interviewees also thought that a shared reporting system is a good idea, although many were not very familiar with the shared reporting systems. In principle, they thought it helps to share experiences with other companies and that it could be very useful for smaller companies to gain wider experience. One Master stated that he visited the Insjö's website, but he could not go further into reports due to limited access. One chief engineer proposed that if the system becomes more open and offers people the possibility to search information from the database, it would be easier for the people to search the database for the information in which they are interested. Another chief engineer commented that the only way the system can work and make people utilize it is to create as short and clear reports as possible. Otherwise, people lose interest. Another Master explained that there are not many companies contributing to the existing system, therefore, it is easy to guess where the reports come from. When the system becomes more international, reporting becomes more anonymous and people may be more willing to make reports. Most of the ABs stated that they would be interested in reading reports from other companies. One AB believed that this strongly depends on personal interest and not all people are interested in reading such reports. One Master was in the opinion that they do not have time to read reports coming from an external system. He believes that a person can only learn from his/her own experiences/mistakes. According to him, some reports coming from classification societies are helpful to a certain extent.

The interviews also revealed that the proper introduction of shared reporting system requires a lot of marketing and co-operation among companies and it is not enough that the system is simply put into operation. The responsible person for the Insjö system told that in the beginning they worked together with 30 companies to create the system. In his opinion, the only way to convince companies to use the system is to show that it is a tool that can be used to solve their problems together with other companies. There are still elements that require development in the Insjö system regarding the safety alerts, lessons learnt and feedback to the companies. To get the message through, it is essential to co-operate with the companies, to develop the system together and to share good experiences, so that other companies see that it is beneficial to use the system. Actually, the responsible person for Insjö believed that currently, this co-operation is the most important benefit offered by the Insjö system. An important aspect to consider is that although the companies are competing in markets, they do not have to compete in safety.

3.4   The role of incident reporting in the development of safety

Almost all the interviewees thought that incident reporting had helped to increase the safety awareness and safety level at the company, although especially interviewed onboard personnel recognized that safety thinking has improved compared to the situation 10 years ago, but the number of near miss reports has not shown the same level of increase. Only one interviewee questioned the need for incident reporting at shipping companies and saw the sharing of experiences and lessons learnt as the duty of maritime authorities.

The importance of incident reporting was explained as follows: There are many safety-related events taking place onboard. Because resources are scarce, both onboard and on shore, the sharing of incidents makes work easier for the crew of the entire fleet and also for the superintendents or DPAs. Sharing experiences and learning from mistakes strengthen safety and safety awareness onboard. Although formal regulations and rules are needed to enhance safety, rules and practices that are easy to implement onboard are also needed, and by using incident reporting, it is possible to develop practices and rules in a self-regulatory way.

It was emphasized that idea of safety culture at the company starts from the top management. If they do not implement a good safety culture, it is not possible to do it onboard either. Some interviewees stated that at their company, the positive development of safety culture in recent years has result from the active role of the management in conveying the culture to all ships. Communication is an important aspect in the development of the safety culture at the company. The existence of a No blame culture is also an essential ingredient of good safety culture. Many interviewees described that the no blame culture at their company works in a way that when they report a serious occurrence to the company names are never asked. However, one AB, who is a inexperienced temporary worker onboard, stated that sometimes he had been insulted by old experienced seafarers. He added that they are not many but they still exist. One chief engineer also stated that there still is a blame culture on the ship side, based on his work with many other chief engineers and Masters who are still working for the company and he explained that they look for a specific person when something happens. Four interviewees onboard said that it requires more effort to create good safety culture if there is a multi-national crew.

Many interviewees stated that it always takes time to implement an incident reporting system, both internal and shared systems. If seafarers acquire good experiences from reporting, they probably make the next report more willingly. One way to harm the reporting process is to downplay the received reports; actually it is a way to make sure that a person in question does not report again. It is also important to remember that the process is continuous and the importance of reporting must be brought forth regularly in order to keep the system functioning.

Some interviewees also mentioned the role of authorities. A few participants have had individual experiences in the airline industry. While discussing reporting and safety culture, they often referred to their experiences and compared shipping with the airline

industry. The interviewees explained that the safety thinking starts at the clap/amateur level, it can be civil or navy or small aircraft, and the same quality is achieved for all of those in the airline industry. However, in the maritime industry, there are small boats, sailing yachts which are regulated or controlled by different organizations. The problem is that they all navigate in the same waters. One Master criticized maritime authorities of being excessively bureaucratic.

3.5   Conclusions from the interview study

This section draws together the findings from the interviews, first by summarizing the obstacles to reporting, and subsequently presenting the general discussion and conclusions. Obstacles to reporting were acquired from several sources and contexts and that is why they are summarized here as one entity.

3.5.1   Obstacles to reporting

According to DPAs some obstacles to reporting are:

➢ Natural human behavior; concealing mistakes, being ashamed.

➢ Human tendency to obey the rules. Near miss reporting is not yet perceived as mandatory by many seafarers. One interviewed superintendent gave an example of a high ranked officer on their ships who consistently refused to report. The man explained that whatever company procedures tell about near miss reporting and its role in the ISM Code, he still thinks it is voluntary and refuses to report.

➢ Cultural differences; at one company, the DPA explained that when they first started working with a Polish crew on one of their ships, the ship was the worst ship in relation to the number of reports, however, they were very good at performing actions and maintaining the vessel in a good condition. He claimed that it was the feeling of shame that restricted them to report.

➢ Non-user-friendly systems; the DPA of the company which uses the AMOS system believes that non-user-friendly systems might be the reason for not contributing to reporting, particularly at the rating side.

In general, the officer side believes that the number of reports they make on their ships does not represent the reality, while on the rating side, the general thought is that the number represents reality, and that there are no concealed near misses. This result is subject to a few exceptions on both sides. When the people that were not satisfied with the number of reported near misses were asked what could be the main obstacle for reporting, the following reasons were found:

➢ Being ashamed, not blamed. A Master says that when the ISM Code first was implemented at the company, many of his colleagues thought that they were required to expose their skills.

➢ Matter of age. Some believe that the younger generation is more aware of and

sensitive to safety issues while the older generation sees reporting as additional work.

➢ Time restrictions. While many on the officer side do not experience near miss reporting of having a serious workload, the rating side often feels the contrary and claim they do not have time to handle this workload. They see reporting as a part of their work; therefore, they do not want to spend their free time writing down reports. Although reporting is considered as a work, it is still perceived as additional work on top of many other duties that need to be carried out first.

➢ Pure laziness, the nature of seafarers and the traditional nature of the maritime industry. It is believed that initially new things receive resistance from seafarers and it takes time to implement the changes. Usually, measures are immediately taken to avoid the near miss; however, making the report afterwards is often forgotten or ignored.

➢ When the person, to whom the report is made for rating, such as the chief officer or another officer does not show so much interest or states that the matter is not important enough to report or does not give sufficient attention to the matter, people feel discouraged to report.

➢ The 'Nothing is wrong on my ship' thinking. The Master claimed that many of his colleagues think this way, and that they do not want to reveal weaknesses of their ships.

➢ Rules are interpreted differently by different countries. Therefore, it is hard to build a shared behavior for safety thinking.

➢ Time restrictions in emphasizing safety. A chief officer states that it is important to communicate with the crew and tell them the importance of safety at all times. However, other duties, such as handling the invoices, and other paper work, consume so much of their time especially the time of the chief officer and Master. Therefore, they cannot find sufficient time to spend with the crew, which is a disadvantage in the creation of safety culture.

➢ No clear definition of near miss – Being unsure of what to report and not to report. The chief engineer states that it would be better to have a clearer definition of the near miss. The chief officer states that it is hard to make the judgment concerning what to report and not to report. Therefore, it would be good to have more information to show what other ships are reporting and to compare the data with own occurrences, and eventually being able to decide what to report would possibly be much easier.

3.5.2   Discussion and general conclusions

Four companies, at which the interviews were made, are generally regarded as being 'top-of-the-list' with respect to safety culture within the maritime industry in Sweden and Finland. There are very few companies believed to have a better safety culture than these companies. Therefore, the views expressed by the people from these companies should seemingly represent the current best practices within the industry.

The results of the interviews clearly show that these companies have achieved implementing a systematic reporting system with functioning feedback between the

shore and onboard organizations. The representatives of these organizations both on shore and onboard claim that there is an established no-blame culture within their organization.

There are slight differences between the companies and also between the shore and onboard organizations. One major difference is that the companies which have used a reporting system for longer time period (see Table 3.1.) have more stable statistics of reports. They differ from other companies also in the feedback process. People working on the ships of these companies are generally more satisfied with the feedback. They do not feel that the reports disappear somewhere in the system. There was difference in the personnel's views about proposing corrective actions. The DPAs like to request corrective and preventive actions from ship personnel, but the ship personnel might feel that, in this case, there is no point in reporting to the company. In other words, both sides should be included in the process of formulating corrective actions.

There is also a difference in the understanding of reporting level between the officer side and rating side. The rating side personnel believe that they report sufficient number of near-misses, whereas the officers believe that there must be hidden near misses that are not reported due to various reasons. The explanation for this might be that there are differences in how incidents and near misses which should be reported are perceived at the officer side and at the rating side. The results of previous studies (Bourrier 2005; Antonsen 2009) showed that the involvement of all ranks is one of the fundamentals for the effectively working safety and quality systems in high-risk industries.

When it comes to safety culture and the role of near-miss reporting in creating and enhancing safety culture continuously, both shore and onboard personnel agree that the system has an important role in the continuous improvement of safety onboard and that it should be maintained. However, they are actually able to provide limited evidence or examples to show that they have actually benefited from near-miss reporting in relation to safety, such as a the decrease in the number of accidents or incidents. In addition, three out of four interviewed companies did not have any system to follow-up the implementation of corrective actions.

Experiences with external systems are very similar to ones concerning the safety culture. People have the perception that having such a system is an indication that they are in the upper levels in the safety understanding, however, benefits have not yet been fully realized or achieved. The development seems be mutual, as the external system needs reports to create the necessary database to give feedback to the users.

The aim of this study was to look into the near-miss reporting situation at companies which are known to achieve a certain level of safety within their organization. Specifically, the study attempts to find out the level of best practices used within the industry. Although these companies and interviewees also recognize deficiencies and weak points in their reporting systems and reporting culture, these companies have achieved certain elements of safety which do places them at a higher level when compared to many others within the industry.

- ➢ The companies have created a system for systematic reporting. This is a part of creating 'just culture' to counter 'blame culture'.
- ➢ No-blame culture has been achieved at these companies.
- ➢ Awareness that training is important for keeping the seafarers up-to-date in safety related issues.
- ➢ Open discussions with members from all ranks and an atmosphere of trust between officers and ratings seem to have been achieved. This also relates to team work.

4   EXPERT WORKSHOPS ON INCIDENT REPORTING

The CAFE project arranged the International Maritime Incident and Near Miss Reporting Conference (IMISS) 2011 in Helsinki on 1-2 September 2011. As part of the conference program, expert workshop sessions were arranged and this chapter presents the results from the workshops that took place on the first day of the conference.

Workshops were organized so that the participants of the conference were divided to four groups, each group having approximately 10-13 participants. Each group had two moderators leading the discussion. The conference participants included representatives of shipping companies, researchers, maritime authorities, maritime organizations and other stakeholders. In addition to Finnish participants, there were also participants from Sweden, Denmark, Norway, Estonia and Great Britain. The groups were formed so that each group would have representatives from several maritime sectors in order to promote discussion between different stakeholders and to bring out various perspectives in every group.

Workshops dealt with two themes:
1) benefits and obstacles of incident reporting,
2) future development of incident reporting in the shipping industry.

Each group had about one hour to complete the task. Two groups discussed theme one and the other two groups theme two.

4.1   Benefits and obstacles of incident reporting

The specific questions of this task for groups one and two included the following:
- What benefits can shipping companies have from near miss and incident reporting?
- What benefits can the shipping industry have from a shared system?
- What practical obstacles and other obstacles there are to near miss and incident reporting inside the company or to a shared reporting system (such as ForeSea or Insjö)?
- How could these obstacles be overcome?

All participants in group one saw benefits in learning from others and improving ways of working by not repeating the same mistakes. The safety culture has an influence on reporting, but the connection also works vice versa. Reporting the incidents helps to build the safety culture onboard. Reporting can also reduce costs (less accidents on board, less sick leave days, etc.). The advantage of having databases for incidents is particularly clear for small companies, which can benefit from a larger and more diverse data set. Statistical analyses can be performed and trends can be discovered. Compliance with regulations can be easily monitored if company has built in reporting system. Maintaining a database can facilitate searching for specific information and incident reporting can yield safety metrics when no accidents occur, but the question is: can the metrics be trusted.

The main obstacle inside a company is that people feel uncomfortable reporting, or they do not perceive the value of reporting or are not aware of incident reporting. Crew members have contracts for a specific period, and they may fear that if they report, they can be considered as incompetent, and their contract might not be prolonged. Companies can also be considered as incompetent. One obstacle is that companies do not have resources to manage all the paperwork. The time required for reporting is stated as one of the most important obstacle to reporting to a database. There was also discussion concerning the owner`s perspective: do they want to share information about their safety issues to other companies? The question, whether costs invested in incident reporting are justified, or can the same safety level be achieved in some other way (i.e. training) was also discussed.

As it is very important how crews perceive reporting, it was suggested that some crew members should be trained and then returned to their positions and teach others of the importance of reporting through informal conversation. Other suggestions concerned improvements of reporting systems/procedures. The system should be easy to use, and making a contribution should be facilitated e.g. by using mobile phones equipped with a camera to send a report. Positive language should be used, i.e. instead of near miss, one could use "learning opportunity". Offering risk mitigation services based on the collected data was also suggested.

Table 4.1. The results of the workshop group 1: benefits and obstacles of incident reporting

GROUP 1:Benefits and obstacles of incident reporting	
Benefits	Learning from others and not repeating the same mistakes. Positive effect on safety culture. Reduction of costs (less incidents and accidents). Particularly small companies would benefit from common database which would have more diverse data and a greater quantity of it than they can collect by themselves. Reporting systems enable statistical and other analyses. Reporting can monitor if a company is complying with regulations.
Obstacles	Psychological reasons (e.g. people fear that their competency is questioned). Inadequate resources to compile reports and to utilize the reporting system in a company. Companies do not want to share the information for competitiveness reasons. A good safety level can also be reached by using other methods.
Remedies	Training. Positive and effective communication. Improvement and facilitation of reporting procedures. Risk mitigation services.

Group two saw the benefits of reporting in a slightly different way, dividing benefits to benefits for shipping companies and to benefits for the entire shipping industry. They emphasized the positive effect of reporting, for instance, on job satisfaction, on the openness and functionality of the work environment, on the development of procedures and on the safety level and safety culture onboard. At the shipping industry level,

reporting improves the image of shipping, and it enables more systematic analyses and actions to decrease risks, which supports learning within the industry.

Group two also presented the opinion that the main obstacles to reporting are safety culture-related and management issues, for instance the lack of top management commitment or the existence of a blame culture in the company or on ships, but they also reported other reasons. Stable reporting practices are hard to implement if there is a high turnover of employees or they do have an excessive amount of work to do. The costs and benefits of a reporting system are difficult to measure financially. Near misses might not be considered as near misses, but as normal routine. This group also identified psychological reasons, such as the reluctance to written procedures or to admit faults.

The remedies to overcome the obstacles were divided to two groups: remedies that improve top management commitment (e.g. resource allocation, communication and reporting feedback) and other remedies, which included the development of reporting practices and other more general issues such as manning strategies.

Table 4.2. The results of workshop group 2: benefits and obstacles of incident reporting

GROUP 2:Benefits and obstacles of incident reporting	
Benefits for the company/ships	Job satisfaction increases.
	Supports an open and functional work environment onboard/ashore (through trust and efficiency).
	More information about the onboard routines.
	Enables the development of new, better procedures.
	Makes people more self-confident.
	Increased commitment on safety issues.
	"Bottlenecks" can be discovered (e.g. education, man- machine interface etc.).
	Better communication within the company.
	Companies save money in the long run.
	Increases safety and security on board.
Benefits in the shipping industry	Image of shipping improves.
	Reporting enables the studying/learning about events, and the information can be used by regulators and other stakeholders.
	Data benefits investors when buying new technology/ships.
	Fewer serious and potential incidents.
	Learning from each other, e.g. to identify risks.
Obstacles	Lack of top management commitment.
	Culture does not support reporting (on the ship or in the company).
	A "no blame" culture does not exist and it takes time to adapt the culture.
	Crew-related issues (high turnover of employees on ships, fatigue, excessive amount of work to do).
	Additional costs.
	Some near misses are not considered as near misses, but as normal routine.

	Reluctance to written procedures. Fear of admitting faults. Benefits are difficult to measure (financially).
Remedies to improve top management commitment	Allocate resources to incident reporting. Increase training, both for the top management and crews. Effective communication between the ship and shore. Fast responses to reports. Proper feedback from the management.
Other remedies	Focus on the company's manning strategies (e.g. length of contracts, whether or not to use of crewing companies). Change the way how reports are received. Improve the distribution of work.

Both groups identified the benefits of incident reporting of being not only the improvement of safety (which is the primary goal of incident reporting), but also other benefits such as better job satisfaction, improved work procedures and a better working environment. There seemed to be disagreement on whether reporting reduces or increases costs. Many believed that if accidents and incidents can be avoided, it reduces costs, but some participants also stressed the costs of having a reporting system and that it is hard to evaluate the system's benefits financially, because naturally, it is impossible to know what would have happened without the reporting system.

4.2   Future development of incident reporting in shipping

The specific questions in this task included the following:
- What should be done to increase near miss and incident reporting in shipping companies/in the shipping industry?
- Who should be responsible for different tasks, e.g. what is the role of authorities?
- Does the shipping industry need more near miss and incident reporting?
- How could the co-operation between stakeholders be developed?

The first group stated that the first priority is the promotion of a no-blame culture, for the creation of which the management should have sufficient power and resources. This group saw the promotion of incident reporting as the "circle of good reporting".

1. *Management commitment.* The management should promote reporting by setting targets for reporting and motivating and encouraging personnel to submit reports.
2. *Feedback and rewards.* The management has to give feedback without delay and could consider some rewards for reporting, which do not necessarily have to be monetary rewards. Feedback should be given by interacting with personnel,

and the results and conclusions of reports should be published regularly e.g. as graphics or statistics.
3. *Corrective actions.* The management should ensure that corrective actions are taken and that all employees are aware of them.
4. *Training.* Both the functionality of the reporting system and corrective actions require training in order to emphasize the importance of reporting and to implement corrective actions properly.
5. A *no-blame culture* must be promoted with exemplary behavior of the management.

All these issues are important for a reporting system, and they serve to reinforce each other. The group also specified the requirements for the reporting system to be the following: The threshold for initiating a report should be very low. All members of the crew should have access to reporting system and they should be allowed to make reports. The reporting application should be easy to use and the reporting forms should be simple.

The second group started by pointing out issues that have an effect on the future development of incident reporting and by rating them in the order of importance. The first five issues have high importance and following three (6.-8.) are of medium importance. The group was in the opinion that all the mentioned issues have some relevance and they are all needed to reach a good level of reporting.

1. *Creating a no-blame culture.* The participants were in the opinion that a blame culture is a main factor that restricts reporting.
2. *Feedback.* Reports should be analyzed by the authorities and safety related issues should be highlighted.
3. *Training.* Training of new crew and revision trainings for existing ones were specified with regard to creating a reporting culture. Improved selection procedures should be applied for crew selection. Education system for seafarers should also be updated all the time, such as bringing up issues like incident reporting during the courses in which the seafarers participate.
4. *Sharing information and cooperation.* Communication between the company and the ship is seen as an important factor and companies should describe the benefits of reporting to their employees to encourage them to make more reports.
5. *Sharing experiences and benefits of reporting.*
6. *Anonymous reporting.*
7. *Mandatory reporting.* Mandatory reporting was mentioned in terms of both having a standardized reporting system and creating a more serious approach to reporting.
8. *The definition of incident and near miss.*

During the discussions, it was mentioned that reporting systems, irrespective or in the computer, should be easy to use. The participants were asked if people onboard lack time to provide sufficient and good quality reports. Some were in the opinion that this is

the case, but others stated it is a part of their routine job. However, conditions for making the reporting as easy as possible should be provided.

5   BEST PRACTICES OF INCIDENT REPORTING IN SHIPPING

This chapter draws together the findings from the comparison of shared reporting systems which were presented in Chapter 2, the interview study in shipping companies in Sweden and Finland (Chapter 3) and the results of expert workshops on incident reporting (Chapter 4). First, we conclude the preconditions for successful incident reporting. Section 5.2 discusses the questions related to the number and quality of the reports, and Section 5.3 contains conclusions about shared reporting systems.

5.1   Preconditions for successful incident reporting in a shipping company

The preconditions for successful incident reporting found in this study are very similar to those that have been documented in previous literature. In Figure 5.1 the preconditions are grouped to technical aspects, company management related and onboard preconditions.
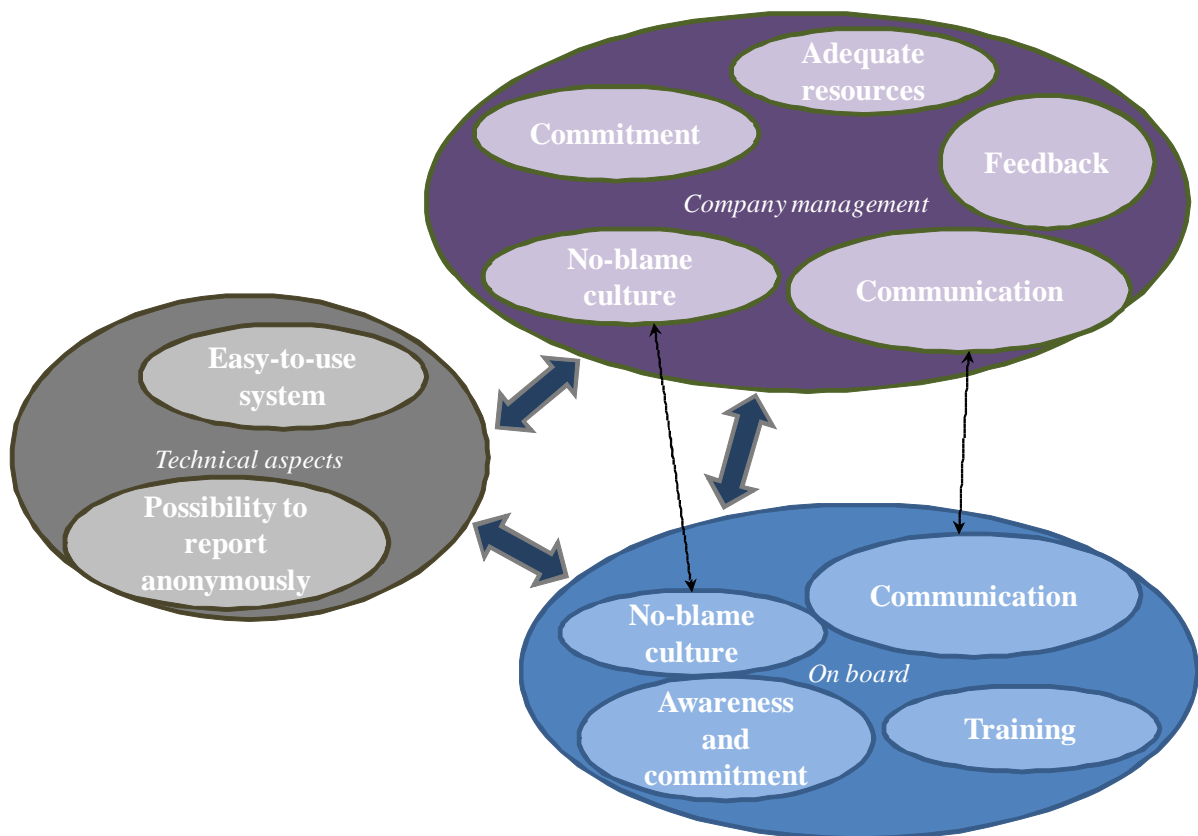
Fig. 5.1. Preconditions for successful incident reporting in a shipping company

Commitment. Management commitment to incident reporting is crucial. If the company is not committed to promote reporting, it is not likely that reporting is carried out on ships either. Some ways to show commitment include, for example, the allocation of ***adequate resources*** for carrying out, processing and analyzing the reports, maintaining

good *communication* within the company, e.g. by visiting ships and communicating with ship personnel about the importance of reporting and tackling problems concerning reporting if there appears to be any. The management has to show their ships that they believe incident reporting is important and that it is beneficial to all. The companies which have been successful in creating a reporting culture have also acknowledged that the process takes time and it involves continuous work – it is not enough that the system is rapidly implemented.

Feedback. Studies on incident reporting widely acknowledge that feedback concerning reports is crucial for the successful implementation of the reporting system (e.g. van der Schaaf & Kanse 2004, Sanne 2008, Oltedal & McArthur 2011). If employees do not receive feedback concerning their reports, they become frustrated and feel that the system is of no use. One aspect of good communication is the proper feedback to reports within appropriate time after the event has taken place. Those who make reports should be actively asked to recommend improvements for the prevention of the event in the future. This benefits the feeling of involvement, competence and participation and it also helps to create improvements that are practical to implement. However, also DPAs and other shore personnel should give their input to the formulation of corrective actions to show that their involvement is beneficial. Sharing feedback in the regular meetings seems to be an effective way to give feedback on the reports and to share experiences. In addition, different kind of written reports or safety alerts are beneficial, but it is difficult to know if they are actually read.

No-blame culture. If an employee fears that he/she will be accused or ridiculed after the incident, it is unlikely that he/she will make a report. One part of no-blame culture is to not trivialize received reports. It is very important to consciously become aware of that the purpose of incident reporting is to learn from mistakes and incidents at the organizational level. Everybody makes mistakes. The no-blame culture is important both at company level and at ship level.

Communication on board. Good communication onboard contributes to the reporting of incidents by reducing obstacles to reporting incidents within a work community. Good communication also reduces the risk of a blame culture because people do not have to fear that their message is misunderstood or misused. The role model of the ship Master and other officers is important for the promotion of good communication onboard. Formal (safety) meetings and informal meetings are also important for good communication. One part of good communication is also that possible problems in communication are addressed and effort is made to solve them. Good communication can be promoted also by paying attention to the work teams and the length of contracts. If employees in a work team change continuously, this can prevent the development of good communication. Multinational crews are a challenge from the point of view of communication, which means that more attention has to be paid to the communication concerning issues which are important.

Awareness and commitment. Creating safety awareness not only supports a good reporting culture, but it also raises the safety level onboard in other aspects. If crew members are not aware of safety issues, they see, for instance, near misses as a normal

part of the job and are not likely to take procedures to avoid them. The company's management, commitment and the ship Master have an important role in building the safety awareness among the crew, and safety awareness is closely connected to other preconditions of a good reporting culture, such as commitment, communication and training.

Training. Training is needed, for example, to define what is considered as a near miss or an incident that needs to be reported, to familiarize the crew with the reporting system, to communicate the importance of incident reporting and to raise safety awareness.

Easy-to-use system. An incident reporting system can be organized differently in different companies, but the main point is that the system must be easy-to-use and simple. The reporting form should not be excessively complicated or difficult and time-consuming to fill in. If a majority of reports are made openly, additional information can be asked afterwards if necessary. Moreover, the further processing and analyzing of reports should be considered when the system is planned. Ideally, some part of the information processing and/or procedures can be automated in order to reduce manual and overlapping work.

Anonymity. If there is a no-blame culture within the company, people feel safe to report using their own name, but it is also good to have the possibility to report anonymously in order to bring out cases, which cannot be reported openly for some reason. For a shared reporting system, it is important that anonymity is guaranteed in the processing of a report, although reporting in itself cannot be performed anonymously.

5.2   Number versus quality of reports

As it has been stated several times, the number of incident reports in shipping is not considered adequate and in most cases it does not reflect the actual frequency of incidents. In addition, interviewed companies and employees in this study admit that in reality, all incidents and near misses are not reported.

Considering the theoretical grounds for incident reporting, all small incidents and near misses should be reported because it is important to know how frequently some kind of incident or near miss takes place, and to perform a risk analysis to find out the root consequences[2] of certain type of events and the consequences and costs of if the incident turns into an accident. A single employee on board cannot be expected to perform such wider analysis. On the other hand, if crew members are asked to report everything, this can provoke opposition towards the reporting system. Employees might feel that their competency is questioned and that they are burdened with additional tasks which are unnecessary. One solution to resolve this conflict could be arranging short periods of time during which all events should be reported to the system. After

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[2] The causes of unsafe events can be analyzed in the level of *direct causes*: the immediate reason why an even occurred, and in the level of *root causes*: the factors in the system which allowed the *direct cause* to arise (Jones et al. 1999).

receiving comprehensive information about the events, the company can do conclusions about the further needs for reporting on the grounds of a risk analysis which takes into consideration both the frequency of an event and the probable consequences[3]. One aspect of such risk analysis would also be noticing that there necessarily are not important lessons learnt from every incident or near miss.

It has also been acknowledged that reports tend to focus on technical issues and it is more difficult to report about human errors, even if there is a no-blame culture within the company. Van der Schaaf & Kanse (2004) looked at the reasons for the lack of self-made errors in incident reports in chemical process industry plants and they discovered that there are several types of reasons to refrain from reporting: for instance, workers were afraid or felt ashamed, they did not see any learning opportunity in the incident, the situation was quickly recovered and there were no remaining consequences, and practical reasons such as having no time to compile a report. In addition, the traditional occupational culture in seafaring does not support written procedures, as stated by Knudsen (2009). Reasons that came out in this study were very similar. According to van der Schaaf & Kanse (2004), to overcome these obstacles, clear communication from the management is needed to show sincere interest in learning about all the incidents, instead of the attitude "all is well that ends well". This study also showed that changes are possible if the company management really wants this.

However, there was a rather clear consensus among the interviewees that a maximum number of reports should not be the goal, but the emphasis should rather be on the quality of the reports. Setting formal goals for the number of reports and rewards for reporting can help to initially implement the reporting system, but on the basis of this study it is not a necessity and this can even give the wrong signal to the employees, seeing that safety issues should be a self-evident part of work. The number of reports should not be regarded as an indication of safety level, but rather as an indication of safety awareness (Jones et al. 1999). According to the general reporting practices at the interviewed companies, the officers compile reports to the system, and the rating side appeared to be content with this. If this is a general tendency within the shipping industry, it differs in this respect from other industries in terms of including all ranks actively in the reporting procedure.

On the basis of this study, the shipping industries in Finland and Sweden believe that a good safety level can be achieved also without incident reporting, but in this case, the opportunity for organizational and industry-level learning is excluded, as well as the opportunity to analyze the wider context of accident causation on the basis of incident reports.

5.3   Shared reporting systems

When we compare the shared reporting systems in the global shipping industry to Insjö in Sweden or to Nearmiss.dk in Denmark, the latter are different because they are not

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[3] Risk = probability of an event * harm caused by it.

open reporting systems and only the DPAs of the companies using the reporting system can make the reports. In the case of CHIRP, REPCON and SECURITAS (see Chapter 2), anyone can compile a report, for instance a crew member or a recreational boater. CHIRP, REPCON and SECURITAS differ from Nordic systems also because they are maintained by governmental authorities, while the Nordic systems have been more or less initiated by the shipping industry itself. The number of reports is quite low in CHIRP, REPCON and SECURITAS: CHIRP receives approximately 100 reports per year, REPCON slightly more, but these numbers include aviation and maritime reports, SECURITAS receives 50-100 reports. Insjö and Nearmiss.dk seem to be more successful in gathering reports whereas the Insjö system is currently receiving approximately 1 report per day (Interview with Olle Bråfelt/IPSO Classification & Control Ab 2.9.2011), which totals approx. 360 reports per year. Nearmiss.dk has slightly less than 1900 reports in its database from years 2007-2011, thus it receives approximately the same number of reports per year as Insjö.

The international examples indicate that voluntary reporting systems (Insjö, nearmiss.dk) initiated by the shipping industry receive more reports than systems maintained by governmental authorities (CHIRP, REPCON, SECURITAS). However, hasty conclusions should not be made, because there can be other reasons that affect the number of reports, for instance effort targeted to the reporting system or differences in national legislation, which have not been analyzed in this study.

Incident reporting systems, which have been presented in the Chapter 2, have different ways of distributing the "lessons learnt", but all of the systems send allocated messages to the concerned parties and some also publish public newsletters, safety alerts, or even single reports on the Internet or in paper form. Allocated messages are probably more efficient and naturally more likely to reach the targeted parties, but public safety alerts or newsletters also have a role in incident reporting, for instance, in creating an image of a proactive shipping industry which is willing to promote safety and learn from mistakes.

In the interview study (see Chapter 3), most of the interviewees supported the idea of having a voluntary shared reporting system for instance in the Baltic Sea that all the ships regardless of flag could use. Benefits of a more international system would be that there would be more available cases and the system would support anonymity whereas in one country systems, it can be quite easy to deduce which company is in question. The interviewees also stressed that the shared system must be kept simple, both in regard to its use and to the way lessons learnt are distributed. Reported benefits of a shared system also included that it helps to share experiences with other companies and for smaller companies it is a good way to gain wider experience. In addition, a shared system also supports the development of a no blame culture within the shipping industry. However, who should be responsible for this kind of shared reporting system and how its costs should be covered was not addressed in this study.

The proper introduction of shared reporting system requires a lot of marketing and co-operation among companies and it is not enough that the system is simply put into operation. To convey the right message, it is essential to co-operate with the companies,

to develop the system together with them and to share good experiences, so that other companies see that it is beneficial to use the system.

6   CONCLUSIONS

Incident reporting is a tool of proactive safety and risk management that enables organizational communication and learning about potentially hazardous events and situations. The primary goal of incident reporting is to decrease the number of accidents. The importance of incident reporting is recognized especially in many risk-prone industries of which shipping is one. However, in shipping the utilization of incident reporting has developed more slowly than for example in aviation. Incident reporting is a requirement for commercial shipping set by the ISM Code, which is part of the SOLAS Convention of the IMO, and which has been in force from the 1990s. Still, many studies concerning the ISM Code and safety management have stated that incident reporting is deficient in shipping.

In this report, incident reporting has been approached in three different ways: First, by looking at what kind of shared systems there are in use in shipping. Second, by interviewing employees in Finnish and Swedish shipping companies which have been perceived to have a relatively good reporting culture. Third, by arranging an expert workshop where several stakeholders had the opportunity to express how incident reporting could be improved in shipping. The aim of all these approaches was to find the best practices of incident reporting both at the shipping company level (internal reporting) and at the shipping industry level (shared reporting systems), which could help the shipping industry to develop the utilization of incident reporting especially in the Baltic Sea area.

The results of this study emphasize the factors which in previous studies have been analyzed to be important for a successful incident reporting system. They include such things as the existence of a no-blame culture, management commitment, communication and feedback and that the system is easy-to-use. The companies which were interviewed for this study had all been successful in implementing these core issues. However, we found out that this is not enough. For instance, all the interviewed companies admitted that all incidents are not reported. Technical faults dominate the reports, because there are several reasons (psychological, individual, cultural reasons etc.) why human errors are not always reported. There can also be practical reasons for refraining from reporting, such as having no time to make the reports. If a company wants to acquire the benefits from the incident reporting system, it must continuously work and development the system on the level of the company, for instance problems which may arise in incident reporting must be effectively handled. The management has to show by their own example that they really want to receive incident reports and that they are willing to allocate resources to reporting. In short, it has to be accepted that change takes effort and time, and the whole process of incident reporting must be well organized. Lindberg et al (2010) stated in their study about accident investigation the following, which is equally true also for the incident reporting process:

"If accidents are not adequately reported, or if the selected accidents are not those from which important lessons can be learnt, or if the investigation fails to identify preventable causes of the accidents, or if the results do not reach those who can prevent new accidents, or if information about the results do not trigger preventive action, then

the whole process of accident investigation has failed its purpose." (Lindberg et al. 2010)

The success of incident reporting is closely connected to the success of safety management and factors which affect the level of safety management. Therefore, efforts which are targeted to the reporting system do not only promote learning from incidents but also the overall safety management and safety awareness. This can also support, for instance, improved job satisfaction and a good working environment. In addition, the utilization of incident reporting supports shipping companies and the whole industry in developing the safety of their operations in a proactive and self-regulatory way. It enables the shipping industry to develop its own solutions to safety risks without the need to wait for decision-makers and authorities to implement the solutions by regulatory measures.

At the shipping industry level and in the studied area, there is still lot to improve with regard to the shared reporting system. Benefits of sharing reports and lessons learnt are not fully realized as many companies are not using shared reporting systems. The recommendation made on the basis of this study is to aim toward developing an open, shared reporting system in the Baltic Sea area. The benefits of a more international system compared to the national systems would be that there would be more cases available for analysis, and the system would support anonymity, whereas in one country it can be quite easy to deduce which company is in question, and the system would make it easier to share the experiences of one company with a larger share of companies, in particular, this would be a good way for smaller companies to gain wider experience. A shared system would also support the development of a no blame culture within the shipping industry.

6.1   Further research and actions

Incident reporting has been extensively studied in the academic world from several perspectives. The factors which are important for successful incident reporting and obstacles to reporting are well known. One issue which is still to a large extent not discussed is why incident and near miss reporting has progressed so slowly in the shipping industry, when the factors which support reporting and the problems in reporting have been long known. There are plenty of examples and references from other high risk industries that concern the role of incident and near miss reporting in proactive safety work.

In the CAFE project, the School of Engineering at the Aalto University is analyzing the utilization of incident data for risk analysis and modeling, and the results of the study will be published in the future. In addition, the CAFE project deals with the modeling of safety management, the role of Corporate Social Responsibility in maritime safety development and occupational safety. All output and activities of the CAFE project can be found on the project website: http://www.merikotka.fi/cafe.

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APPENDIX 1

Interview questions:

➢ Please describe the system you are using to report near-misses within the company. Who carries out the reporting? What kind of incidents and near-misses are reported? What is the content of reports? How are the personnel advised concerning what kind of incidents and near-misses should be reported and how to make the report? Approximately how many reports are received per month/per year? How long have you been using the reporting system? Have you previously tried other systems? How has the number of reports evolved during the time you have used the system?

➢ Do you use any external reporting system? Which system? Insjö / ForeSea? What is your opinion on these systems and their purpose? How can these systems be used as an advantage?

➢ Comparison of internal and external systems? Are you happy with both or do you see the external system as causing additional 'workload'? Are there any other reasons that inhibit reporting to the external system? Are you happy with your internal system? Please name some of the benefits of the system. What kind of development needs do you see in both the external and the internal system? If you believe that an external system is not needed, please explain why. Do you believe that you can learn from other companies' experiences? What kinds of incentives are required to promote the entering of reports to the external system?

➢ How is the sending of feedback from the company to the ship arranged? How are reports processed after the DPA receives them? Is there some kind of analyzing system in use? How are "the lessons learnt" shared inside the company? Please give some practical examples e.g. on how reporting has changed onboard procedures? Is there some kind of follow-up to how reporting has affected the actual operations?

➢ How much does near-miss reporting affect the creating of a safety culture? How important is near miss reporting when developing the safety culture and enhancing the safety level? What kind of obstacles there are for reporting and for the development of safety culture? Which factors strengthen the safety culture and the usefulness of near miss reporting? Do you think the number of reports is an indicator of safety level?

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